to renounce. He alone who has striven and won can enrich the world by giving away the fruits of his victorious experience. . . . The ideal of giving, of enriching—in fine, of self-renunciation in response to the highest call of humanity, is the other and complementary ideal."

The scientific papers are divided into two groups: part i., "Response in Plant Organs," and part ii., "Growth and its Responsive Variations." In many of the papers Sir J. C. Bose was assisted by his research students.

Ever since the days of his clumsy efforts to induce preparations of frogs' nerves and muscles to perform their movements with military precision, the present writer must confess to a dislike to all dealings with smoked glass plates and tracings thereupon. The records upon which the conclusions of the Calcutta laboratory are based are, however, on an entirely different level. In these, skill in manipulation and the most ingenious clockwork and electrical devices have been combined to evolve methods whereby the minute movements of response to carefully regulated stimuli have been recorded on the same chart as their time relations.

In order to cut out errors arising from the variation of factors other than the one under consideration, the observations are in most cases made only for a very short period of time. This is possible with the aid of the great magnification employed; the latter is obtained by a combination of levers coupled with the disturbance of equilibrium in a magnetic field due to the motion of the steel lever in it.

The massed attack of the workers in the Bose Institute has in a very short time cleared up much that was obscure in the phenomena of response. It may be noted, however, that the papers contain very few references to current literature, but this is perhaps owing to the novelty of the methods used. In particular, the recent work upon the transmission of a stimulus through a glass tube in the absence of all protoplasmic connection is of interest in relation to certain of the Calcutta experiments.

W. R. G. A.

ABNORMAL PSYCHOLOGY AND EDUCATION.

Echo Personalities: A Short Study of the Contributions of Abnormal Psychology towards the Solution of some of the Problems of Normal Education. By Frank Watts. Pp. 111. (London: George Allen and Unwin, Ltd., 1918.) Price 4*s*. 6*d*. net.

MANY readers of the voluminous literature upon mental and nervous disorders published almost weekly in our own country must have been struck by the vast stores of information for the educationist which these writings contain. The significance for education of much of this information lies chiefly in the fact that it tells the teacher what to avoid, but an almost equal amount is grist of the finest quality for his own particular mill; for many of the painstaking and minute analyses of these states of mental twistedness are but the prelude to a subsequent process of re-education. Here, if anywhere, may the educator of the normal child help and find help.

While, as we said, many persons must have felt all this, few have ventured upon the task so courageously undertaken by Mr. Frank Watts, that of refracting the rays of light from the dense and clouded medium of psychopathology into the somewhat clearer atmosphere of normal education. And if one feels, here and there, that an important ray fails to get through, there is little justification for grumbling at the properties of our prism, for it is almost the only one we have.

Mr. Watts has read widely; he leads us from the early giants of rational mental treatment, Pinel and Esquirol in France, and Conolly in England, to our contemporaries—whose height we cannot yet measure, perhaps because they stand too close to us—Janet of Paris, Freud of Vienna, and Jung of Zürich. In his chapter on "Psychopathology and Personality," which seems to us the best in the book, he gives clear little sketches of the typical "nervous" disorders, never forgetting that the blessed word "abnormal" does not exempt him from the obligation of showing their near relationship to "normal" eccentricities and weaknesses.

In his chapter on "The Crowd at School" he boldly acknowledges the existence of a fact—often protectively coloured, but nevertheless angular and unyielding when one strikes against it—that suggestion is the means by which most of the child's beliefs are inculcated. He draws from this the obvious conclusion that the teacher's duty is to understand the mechanism of suggestion and thereby to utilise its advantages and avoid its pitfalls. It is good to see Mr. Watts making use of that salutarily disquieting book by Mr. Trotter, "The Herd Instinct in Peace and War." But we feel that a still more extensive use of Mr. Trotter's explanation of the present unfashionableness of rational opinion and of his suggestions for making it fashionable in the future might have strengthened this chapter still more. Perhaps, however, the trouble about Mr. Trotter's "Herd Instinct" is that the title would be improved if he avoided the term "instinct" and used another word instead of "herd." Which brings up the subject of Mr. Watts's own title. On buying the book, one may understand what the title means. But is not this a reversal of the usual process?

The final chapter, on "The Psychology of the Defective Mind: its Influence upon Teaching Methods," deals in a very up-to-date way with the subject. One paragraph may be offered to the reader here as food for thought:

"One may perhaps draw attention here, in passing, to the popular modern educational ideal of self-realisation as the ultimate good. Séguin occupied himself, like Froebel and Rousseau before him, wholly with the problem of the perfecting of human personality, but a sane study of abnormal psychology should prevent us adopting the unfortunate heresy that personality is the most

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sacred of all the good things with which the universe teems."

In his book Mr. Watts has probably attempted too much. But ample justification for this is his readiness to share his knowledge with others.

T. H. P.

OUR BOOKSHELF.

The Human Skeleton: An Interpretation. By Prof. H. E. Walter. Pp. xv+214. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1918.) Price 10*s.* net.

THE human skeleton has been the favourite text of anatomists for many a day, but never before has an author couched his discourse in more racy and picturesque phraseology than that employed by Prof. Eugene Walter. Indeed, it is the author's method of treatment which justifies his book, for the theories and opinions which he sets forth are those with which medical students have been familiar for a past generation. The book is designed to appeal to the layman rather than to the professional student. "The ordinary layman seems, subconsciously at least, to regard a consideration of his 'insides' as something rather impertinent and indelicate, a subject, in truth, unavoidable whenever complications set in, but quite barren and forbidding to one simply in quest of pleasant stimulating intellectual adventures." Prof. Walter's aim is to represent the human skeleton as "a very wonderful and animated piece of architecture, full of beauty and inspiration for one who looks upon it with a seeing eye and considers its age-long evolution with a comprehending and sympathetic mind."

To elucidate the subject of his discourse the author culls facts from the whole realm of the animal kingdom, both present and past, and cites examples from standard works on embryclogy and anthropology. A living internal skeleton, such as vertebrate animals are provided with, represented "a brand-new idea of far-reaching evolutionary significance," whereby "*Thermomorphs* lifted tons of flesh into the air upon majestic bony scaffoldings." Hair and epidermal structures are described as "relics of a bygone age." The human skeleton illustrates the "thrift and resourcefulness of Nature," the "chequered career" of individual structures, and, in many of its parts, "a complicated series of makeshifts." Here and there, however, one observes that the author's statements are loose and scarcely accurate. His statement on p. 74 that "the odontoid process rocks back and forth and from side to side upon an articular surface within the ring of the atlas, thereby allowing lateral movements of the head," is one which would prove fatal to a candidate in an examination in elementary anatomy, and unfortunately there is a considerable number of similar misstatements of fact. One regrets that the author has not taken more trouble to become accurately acquainted with the human skeleton, for he possesses a very happy power of exposition.

Manual de Fabricantes de Azucar de Caña y Quimicos Azucareros. By Dr. Guilford L. Spencer. Traducción Autorizada de la 6ª Edición Inglesa. By Dr. Gaston Alonso Cuadrado. Pp. xvii+617. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1918.) Price 23*s.* net.

DR. SPENCER'S "Handbook for Sugar Manufacturers and their Chemists" is well and favourably known to sugar technologists. In the sixth edition, of which the volume under notice is the authorised Spanish translation, the principal new feature is a chapter on evaporation, written by Prof. W. H. P. Creighton, of Tulane University, New Orleans. In this the scientific principles which govern the concentration of sugar juice by heat are elucidated at some length, and their practical applications to vacuum evaporation explained.

Speaking generally, the section devoted to manufacturing processes gives a good account of sugar production as carried out according to the best American practice in Louisiana and Cuba. In the earlier part, dealing with crude sugar, descriptions of various modern improvements are included, such as the "Norit" carbon process of decolorising, the use of Hind-Renton grooved rollers in the mill, and the Bach "sulphitation" process as employed in Java. Mr. G. P. Meade, superintendent of a Cuban sugar refinery, contributes an interesting chapter on refining. The analysis of sugars and the general chemical control of the manufacture are fully explained, a good collection of tabulated data being provided.

Like the original English work, the translation is in a handy, compact form, suitable for carrying in the pocket. Its six hundred pages will be found close-packed with sound and well-arranged information.

Prothèse Fonctionnelle des Blessés de Guerre. Troubles Physiologiques et Appareillage. By Dr. Ducroquet. Pp. xi+235. (Paris: Masson et Cie, 1919.) Price 5 francs.

THE equipment of soldiers who have been permanently lamed or maimed with appliances which will mask or make good their defects tasks to the utmost that department of surgical endeavour known as prosthesis. Dr. Ducroquet's "Functional Prosthesis" is entirely concerned with defects and injuries of the arm and leg, and hence the problems he has to solve are those relating to the kind and degree of movements which occur at the various joints of the limb. A very clear and accurate account is given of the mechanism of walking and of the manner in which defects can be made good by the use of appliances. Both surgeon and anatomist will find much that is new in Dr. Ducroquet's pages, particularly regarding the position and direction of the axes of the various joints of the limbs. This book has a value which extends beyond the immediate needs of the military surgeon.

A. K.

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